3-758-828-13(1)

CDU55S

CD-ROM Drive Unit

User's Guide

Owner's Record

The model and serial numbers are located on the top side of the drive. Record these numbers in the spaces provided below. Refer to them whenever you call upon your sales representative regarding this product.

Model No. _____ Serial No. _____

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

CAUTION

As the laserbeam used in this CD-ROM drive unit is harmful to the eyes, do not attempt to disassemble the cabinet. Refer servicing to qualified personnel only.

This unit uses CD-ROM discs with the following mark.

COMPACT disc

When you use this unit as a CD player, use compact discs with the following mark.

COMPACT disc DIGITAL AUDIO

CAUTION	INVISIBLE LASER RADIATION WHEN OPEN. DO NOT STARE INTO BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS.
VORSICHT	UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET. NICHT IN DEN STRAHL BLICKEN, AUCH NICHT MIT OPTISCHEN INSTRUMENTEN.
ADVARSEL	USYNLIG LASERSTRÅLING VED ÅBNING SE IKKE IND I STRÅLEN-HELLER IKKE MED OPTISKE INSTRUMENTER.
ADVARSEL	USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES. STIRR IKKE INN I STRÅLEN ELLER SE DIREKTE MED OPTISKE INSTRUMENTER.
VARNING	OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD. STIRRA EJ IN I STRÅLEN OCH BETRAKTA EJ STRALEN MED OPTISKA INSTRUMENT.
VARO!	NÄKYMÄTÖN AVATTAESSA OLET ALTTIINA LASERSÄTEILYLLE. ÄLÄ TUIJOTA SÄTEESEEN ÄLÄKÄ KATSO SITÄ OPTISEN LAITTEEN LÄPI.

This label is located on the top of the drive.

Dieser Aufkleber befindet sich an der Oberseite des Gehäuses.

INFORMATION

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CLASS 1
LASER PRODUCT

LASER KLASSE 1
PRODUKT

This CD-ROM Drive Unit is classified as a CLASS 1 LASER PRODUCT.
The CLASS 1 LASER PRODUCT label is located on the top of the drive.

Bei diesem CD-ROM-Laufwerk CDU55S handelt es sich um ein Laser-Produkt der Klasse 1. Ein entsprechender Aufkleber mit der Beschriftung LASER KLASSE 1 PRODUKT befindet sich auf der Oberseite des Geräts.

Trademarks

- MS-DOS is a registered trademark of Microsoft Corporation.
- IBM PC, PC/XT, and PC/AT are registered trademarks of International Business Machines Corporation.
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- AMP is a registered trademark of AMP, Inc.
- 3M is a registered trademark of the Minnesota Mining and Manufacturing Company.
- JAE is a registered trademark of Japan Aviation Electronics Industry, Ltd.

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Introduction

Features

The CDU55S is an internal CD-ROM (Compact Disc Read-Only Memory) drive unit designed for use with an IBM PC, HP Vectra, or compatible computer. It can read as much as 540 Mbytes of digital data stored in a single CD-ROM disc.
The CDU55S has the following features:

General

- Equipped with a parity on/off switch.
- 5 1/4 inch half-height drive form factor.
- Power loading and power eject of a disc. The disc can also be ejected manually.
- Embedded SCSI bus interface (based on SCSI-2).
- Housed in an airtight frame casing.
- Audio CD like drawer loading of a disc without using a caddy.
- 256 kbyte buffer memory on the SCSI controller.

Supported disc format

- Reads data in both CD-ROM and CD-ROM XA standard formats.
- Reads data in CD-BRIDGE format including PHOTO-CD.
- Reads standard CD-DA ("Red Book") encoded discs.

Performance

- Supports standard, double and 2.4 times speed operations with real time error correction.
- Fast access time ensuring reliable high-speed data access.

Audio

- Outputs 16-bit digital audio data over the SCSI interface.
- Equipped with audio line output and headphones jack for audio CD playback .

Software Requirement

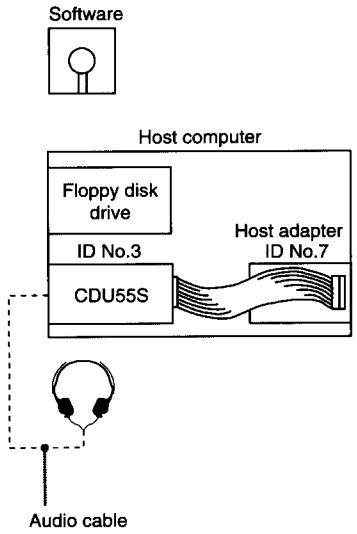
To access data on CD-ROM discs, the appropriate device driver and MSCDEX (supplied with the host adapter) must be installed in your computer. See the manual that comes with the host adapter for details.
The application software you need for using the data on a CD-ROM disc depends on the type and format of the target data. See the manual supplied with your CD-ROM disc for instructions.

Example of System Setup

To use the CDU55S, at least the following components are necessary.

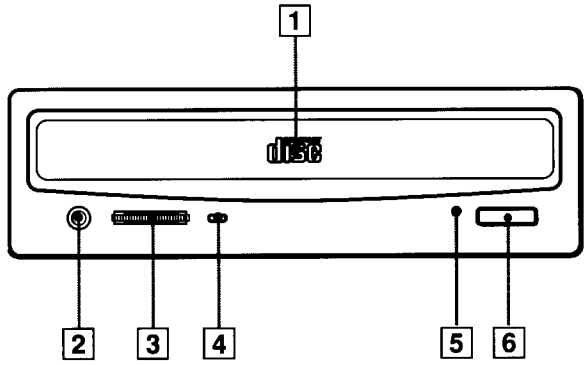
- Computer (IBM PC, PC/XT, PC/AT, HP Vectra, or equivalent)
- Host adapter
- Floppy disk drive
- Interface cable (50 ⇔ 50 pin flat cable)
- Application software

The following is an example of system setup.



Location and Function of Parts and Controls

Front Panel



1 Disc drawer
Accepts a CD-ROM disc on its tray.

2 Headphones jack
Accepts a stereo headphones set. Analog audio signals are output.

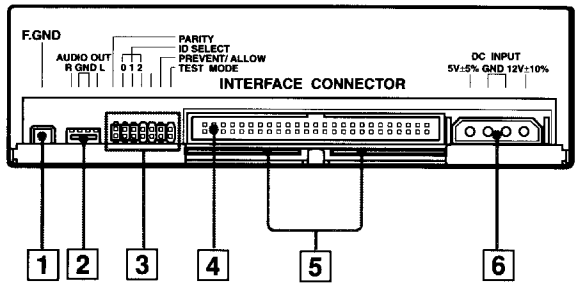
3 Volume control
Controls the volume level of sound output from the headphones jack 2.

4 Busy indicator
This indicator lights up in one of the following colors to show the unit's status.
- Green: Power on
- Amber: TOC (table of contents) read, seek, data read, audio playback
- In addition to the above, the indicator flashes in amber while the drawer is in motion.

5 Emergency eject hole
Used to open the disc drawer manually when neither the Eject button 6 nor a software command works. Insert a fine rod, such as a paper clip, into this hole and push (approx 40 mm stroke).

6 Eject button
Opens and closes the disc drawer.

Rear Panel



1 F. GND (Frame ground) tab
Connect to one of the host computer's ground cables when the drive's frame is not in direct contact with the computer.

2 AUDIO OUT connector
Outputs analog audio signals.

3 SCSI bus setting jumper block
Specifies various SCSI bus settings. See page 11 for details.

4 INTERFACE CONNECTOR (SCSI bus)
Connect to a SCSI host adapter using a connecting cable.

5 Terminator sockets/resistors
Used to terminate the SCSI bus. Keep the resistors in the sockets if the drive is the last device on the SCSI chain. Otherwise make sure to remove the both resistors. Connecting the drive as an intermediate device on the SCSI chain with the resistors attached may cause the drive to malfunction and/or its internal fuse to blow.

Note:
Your CDU55S package may not be shipped with resistors depending on the configuration.

6 DC INPUT (power-in) connector
Connect to the power supply of the host computer.

Precautions

■ Installation

- Avoid placing the drive in a location subject to:
  - high humidity
  - high temperature
  - excessive dust
  - mechanical vibration
  - direct sunlight
- Use this drive in a horizontal position.

■ Operation

- Do not move the drive when it is in use. Doing so may cause data error and damage the optical pick-up.
- Avoid exposing the drive to sudden changes in temperature as condensation may form on the lens inside the drive. Should the surrounding temperature suddenly rise while the drive is turned on, stop using the drive and leave the power on at least one hour before operating it or turning it off. Operating the drive immediately after a sudden increase in temperature may result in a malfunction.

■ Transportation

- Close the disc drawer before moving the drive.
- Keep the original packing materials. When you need to ship the drive to another location, repacking it in its original container will help you transport it safely.

Installing the Drive in Your Computer

This section provides the basic instructions you need to install the drive and host adapter in your computer. You should also read the manual of your computer for specifics of how to install internal devices.

Preparation

You need the following parts and tools (these are not supplied with the drive):

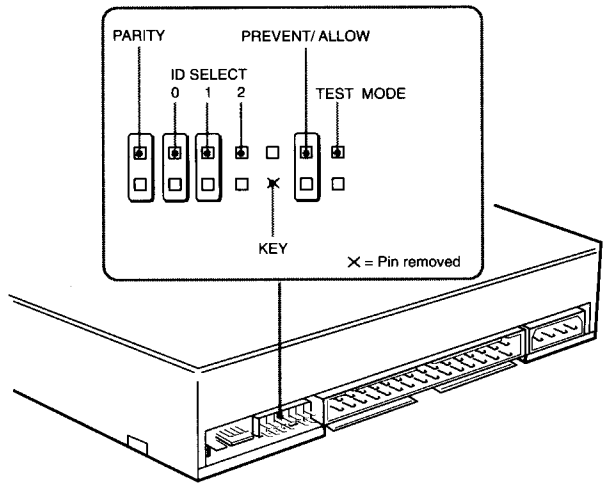
- A flat-blade screwdriver
- Four screws 3 mm in diameter (these should not protrude over 6.0 mm from the surface of the side panels or the bottom plate.)
- Two mounting rails if your computer has mounting tracks.

Unplug the computer and disconnect the cables attached to the back to give yourself more room to work. Do not turn on the power of the computer before completing the entire installation process.

Setting the Jumpers

Set the jumpers on the rear of the drive in accordance with the configuration of your computer system.

The jumpers are preset as illustrated at the factory.



Removing the jumper from a jumper pin pair disables its corresponding function, and installing the jumper enables it.
The recommended jumper for use is AMP Shunts (14227-1), JAE Short Socket (PS-2SH4-1) or equivalent.
The following table shows the function of each pair of jumper pins.

Jumper	Function
PARITY	Enables/Disables the SCSI bus parity check function.
ID SELECT	Assigns the drive's SCSI ID. Select an ID number which is not used by other SCSI devices connected to the bus. ID numbers and corresponding jumper pin settings are as follows:

ID number	Jumper pin settings 0	1	2
0	×	×	×
1	○	×	×
2	×	○	×
3	○	○	×
4	×	×	○
5	○	×	○
6	×	○	○
7	○	○	○

× : Without jumper
○ : With jumper
▭ : Factory setting

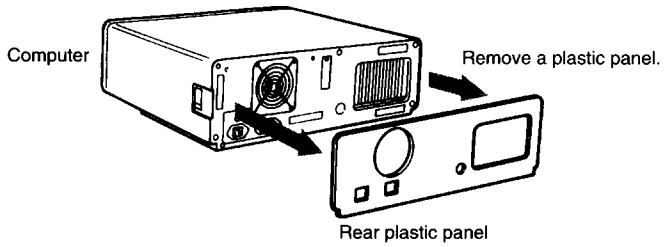
KEY	Prevents a connector (if used in place of jumpers) from being plugged in upside down.
PREVENT/ ALLOW	Enable: The disc drawer can be opened by pressing the eject button or by a software command. Disable: The disc drawer cannot be opened either by the eject button or a software command.
TEST MODE	Reserved for use at the factory only.

Notes:

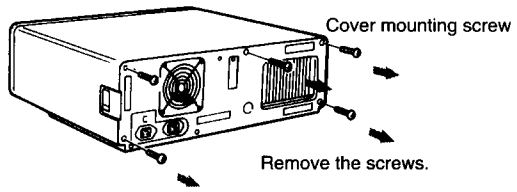
- The lower row of pins are ground.
- ID SELECT, PREVENT/ALLOW, and TEST MODE are recognized only when the power is turned on or SCSI is reset.
- TEST MODE is reserved for use at the factory only. Do not put a jumper over TEST MODE pins. Doing so may cause an unexpected result.

Opening the Computer

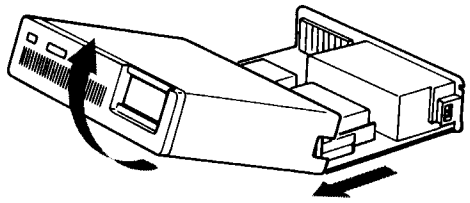
1 If your computer has its rear side covered by a plastic panel attached with plastic hook pad, pull it off.



2 Remove the cover mounting screws.

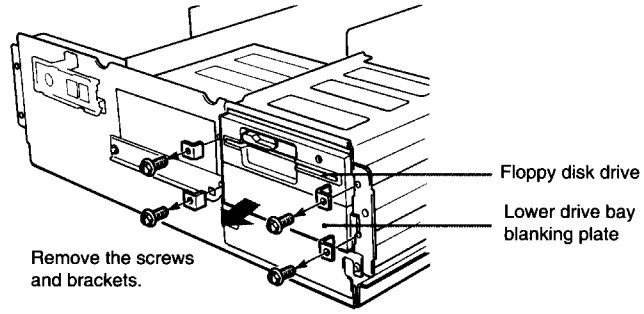


3 Remove the cover of the computer.

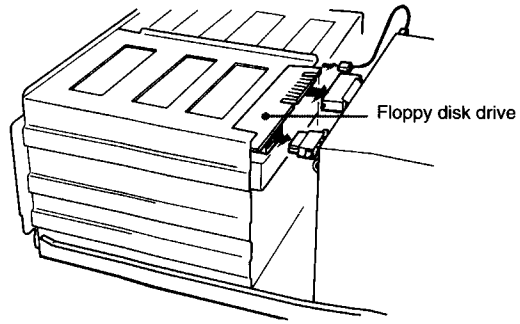


Preparing a Space for the Drive

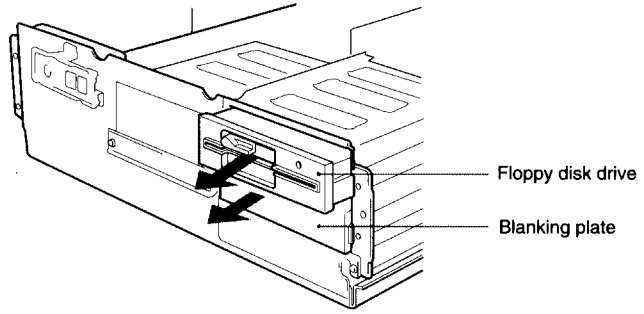
1 Remove the screws and brackets fixing the floppy disk drive and the lower drive bay blanking plate.



2 Disconnect the floppy disk drive.

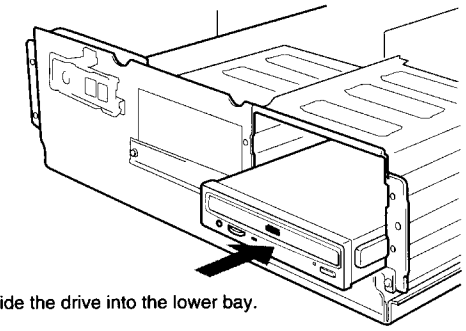


3 Remove the floppy disk drive and the blanking plate.



Mounting the Drive

If mounting rails are necessary, attach them to the drive in the same way as the ones on your floppy disk drive and slide the drive into the lower drive bay. Otherwise screw the drive in place.

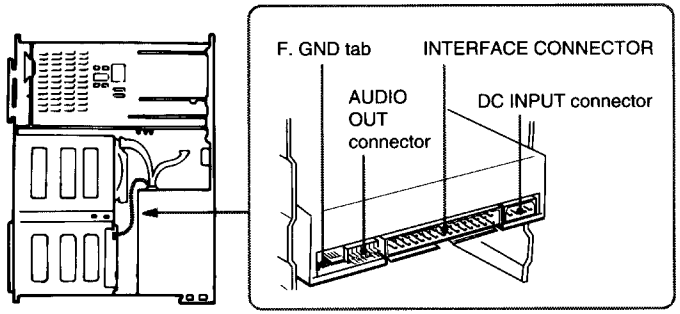


Slide the drive into the lower bay.

Connecting the Drive

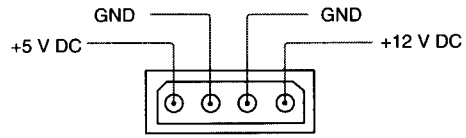
Connect the drive to the computer with the following connectors:

- DC INPUT connector
- F. GND tab (unless the drive's frame is in direct contact with the computer's chassis.)
- AUDIO OUT connector (if you plan to connect audio equipment)
- INTERFACE CONNECTOR.

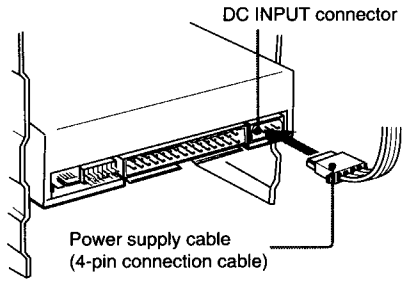


■ DC INPUT connector

The power supply cable recommended are those using a Molex 8981-04P housing and Molex 89880-03 contacts. The pin assigment is as follows.

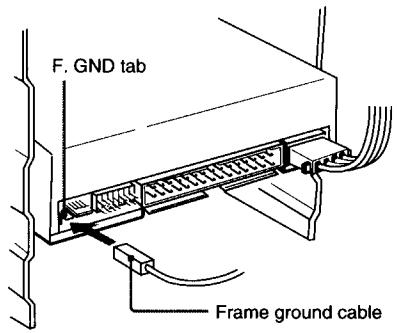


After matching the beveled edges, insert the plug of the power supply cable to the DC INPUT connector and push it firmly in place.



■ F. GND tab

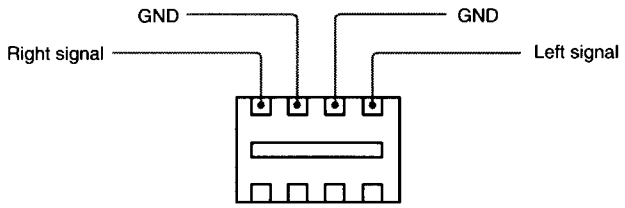
Connect the F. GND tab to one of the host computer's ground cables unless the drive's frame is in direct contact with the computer's chassis (a situation not likely under normal circumstances).



The frame ground cable recommended are those using an AMP 1-480435-0 housing and 170203-2 or 60711-1 contacts.

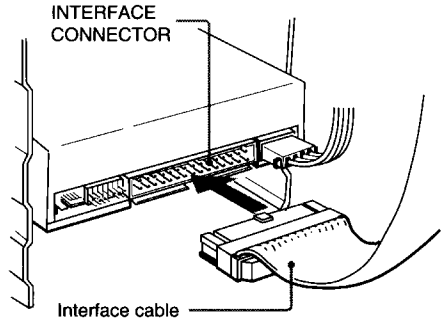
■ AUDIO OUT connector

The audio output cable recommended are those using a Molex 08-50-0113 or 08-50-4114 contacts and a 22-01-3047 housing. The pin assignment is as follows:

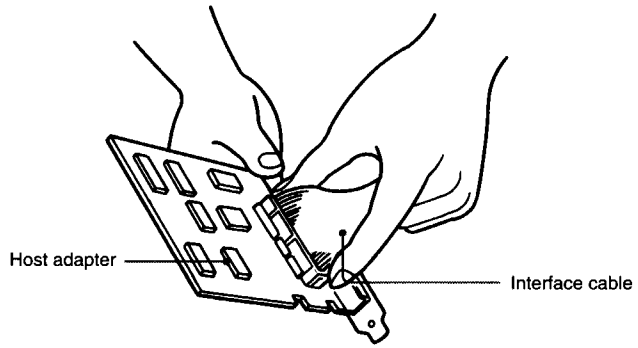


■ INTERFACE CONNECTOR

1 Firmly insert one end of the interface cable into the INTERFACE CONNECTOR.

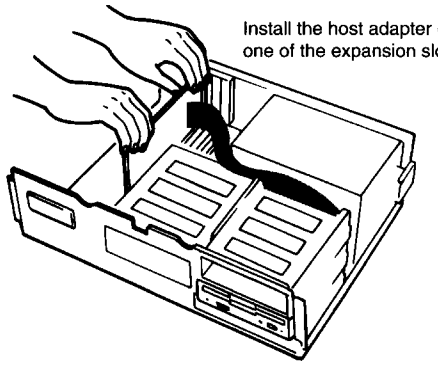


2 Attach the other end of the cable to the host adapter.



Mounting the Host Adapter

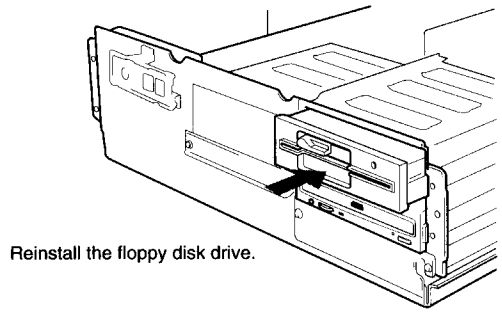
Install the host adapter in one of the available system expansion slots of your computer. Refer to the operating instructions of the host adapter for complete instructions on installation and settings.



Note:
If you connect additional SCSI device(s), you must remove the host adapter's terminator resistors.

Reassembling the Computer

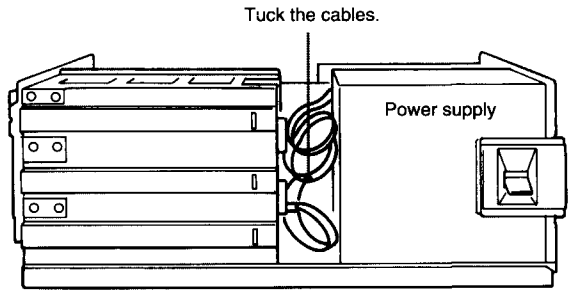
1 Reinstall the floppy disk drive in the top drive bay.



2 Reconnect the interface cable to the floppy disk drive. If there are more than one connector at the end of the interface cable, insert the last connector into the floppy disk drive.

3 Fasten the screws and front brackets as they were before.

4 Tuck the cables behind the drives so that they do not come up above the power supply module.



5 After checking the following points, slide the computer's cover on and fasten the cover mounting screws at the back of the computer.
- Are the connections between the drive and computer correct?
- Are the switches set to the appropriate positions?

6 Remount the rear plastic panel, if any.

Installing the Software Driver

The MSCDEX and a device driver for the CD-ROM drive are supplied with the host adapter. Install both the MSCDEX and the device driver in order to use the CD-ROM drive. Refer to the manual supplied with the host adapter for instructions.

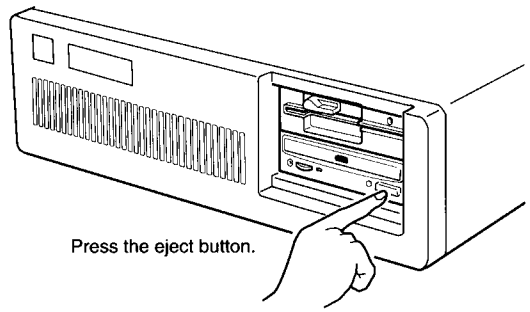
Operating the Drive

This section describes how to start the drive and eject a disc.

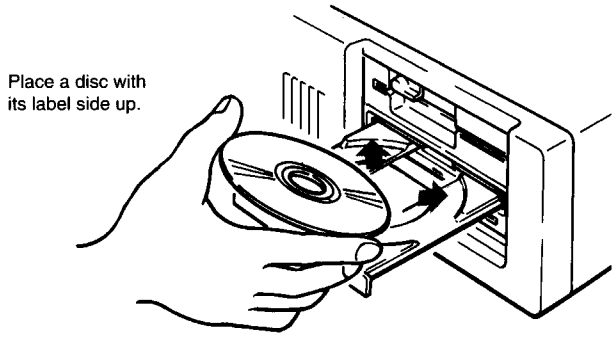
Starting the Drive

1 Turn on the power of your computer.

2 Press the eject button.
The drawer comes out automatically.



3 Place a disc in the drawer with its label side up.



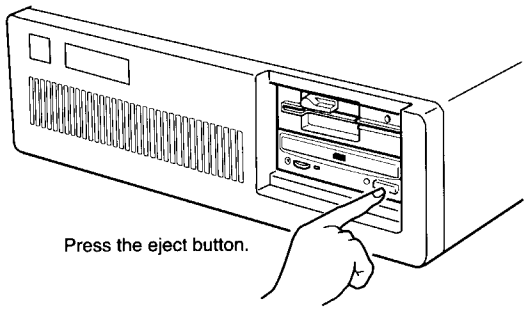
4 Gently push the drawer or press the eject button to close the drawer.
The drive may begin reading the Table of Contents (TOC) data when it accepts the disc. The busy indicator lights up in amber while the drive is reading the TOC.
For subsequent drive operations, follow the instructions provided with the application software you are using.

Note:
The busy indicator stays lit in yellow if:
– the disc is not properly placed on the drawer tray
– a malfunction occurs.

In this case, eject the disc and place it again making sure that it sits properly on the tray. If doing this does not solve the problem and the busy indicator still remains lit in yellow, consult your dealer or qualified service personnel.

Ejecting the Disc

To eject the disc, press the eject button on the front panel. The drawer comes out automatically.



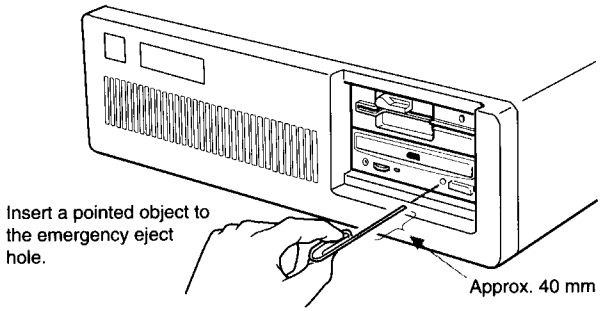
Note:
The eject button does not work if it is disabled by:
– the software you are using
– the PREVENT/ALLOW jumper

■ Opening the drawer manually in an emergency

You can open the drawer manually when it fails to come out by means of the eject button or software commands. To do this, follow the procedure below:

1 Turn off the power of your computer.

2 Insert a pointed object, such as a paper clip, into the emergency eject hole and push.



After removing a disc from the drive unit, consult your dealer or qualified service personnel.

Specifications

■ General

Host interface	SCSI-2 Single ended, alternative one
Disc	
Acceptable discs	CD-ROM mode-1 data discs CD-ROM mode-2 data discs CD-ROM XA discs (readable) CD-audio discs Audio-combined CD-ROM discs CD-I discs (readable) CD-I Ready discs (readable) CD Bridge discs Photo CD discs (single and multi session) CD-WO (fixed and variable packet) discs
Disc diameter	12 cm or 8 cm
Rotational speed	
Innermost track	530 min^{-1} (530 rpm) at CLV = 1.4 meters/s (normal) 1060 min^{-1} (1060 rpm) (double) 1272 min^{-1} (1272 rpm) (2.4 times)
Outermost track	200 min^{-1} (200 rpm) at CLV = 1.2 meters/s (normal) 400 min^{-1} (400 rpm) (double) 480 min^{-1} (480 rpm) (2.4 times)

■ Drive performance

Data transfer rate	
Sustained rate	150 kbyte/s (normal) 300 kbyte/s (double) 360 kbyte/s (2.4 times)
Burst rate	2.5 Mbyte/s (asynchronous) 4.0 Mbyte/s (synchronous)
Access time	
Full stroke	500 ms (typical/normal) 450 ms (typical/double or 2.4 times)
Average	350 ms (typical/normal) 250 ms (typical/double) 220 ms (typical/2.4 times)

■ Reliability

Read error rate (includes retry, with a standard disc)	
L-EC on	1 block /10^{15} bits (normal), 10^{12} bits (double or 2.4 times)
L-EC off	1 block / 10^{12} bits (normal), 10^{9} bits (double or 2.4 times)

■ Audio

Output level	
Line out	0.75 V at 47 kΩ
Headphone	0.55 V at 32 Ω

■ Environmental conditions

Operating	
Temperature	5 °C to 50 °C (41 °F to 122 °F)
Humidity	10 % to 90 %
Atmosphere	Non-condensing
Non-operating/Transportation (72 hours)	
Temperature	–40 °C to 60 °C (–40 °F to 140 °F)
Humidity	10 % to 90 %
Atmosphere	Non-condensing
Vibration	
Operating	1.96 m/s^2 (0.2 G_{0-P}) at 5 Hz to 300 Hz (sweep)
Non-operating	19.6 m/s^2 (2 G_{0-P}) at 7 Hz to 300 Hz
Transportation	1.44 m^2/s^4-Hz (0.015 G^2/Hz) at 5 Hz to 50 Hz (with standard package)
Shock	
Operating	49 m/s^2 (5 G_{0-P}) at 11 ms half sine wave (includes 5 retries)
Non-operating Transportation	490 m/s^2 (50 G_{0-P}) at 11 ms half sine wave 75 cm drop (with standard individual package)

■ Dimensions and weight

Dimensions	146 × 41.4 × 208 mm (w/h/d) ($5\ ^3/_4 \times 1\ ^{11}/_{16} \times 8\ ^1/_4$ inches)
Mass	0.86 kg (1 lb 14 oz)

■ Power requirement

Voltage	+5 V ± 5 % DC and +12 V DC ± 10 %
Ripple	+5 V: ≤ 100 mVp-p
	+12 V: ≤ 200 mVp-p
Current	Hold track state
	+5 V DC: <300 mA (Max)
	+12 V DC: <800 mA (Max)
	Seeking and spin up
	+5 V DC: <500 mA (Max)
	+12 V DC: <1.8 A (Max)

■ Connectors

INTERFACE CONNECTOR	
(with DC INPUT connector)	AMP 179376-1 or equivalent
AUDIO OUT connector	Molex 5046-04A or equivalent

■ Laser

Type	Semiconductor laser GaAlAs
Wave length	780 nm
Output power	0.6 mW
Beam divergence	53.4° ± 1.5°

Design and specifications are subject to change without notice.

■ Dimension diagram

Important:
The overhang of the screws should not exceed 6.0 mm from the surface of the side panels or the bottom plate.